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Abstract

The Greater Earth Lunar Power Station (GE \oplus -LPS) is a habitable space station in lunar orbit that is designed to provide solar energy for lunar operations. Space-Based Solar Power (SBSP) and space tourism could become synergistic economic drivers for future space development. The main obstacle to implementing SBSP is launching a solar power satellite (SPS) from the surface of Earth. John Mankins' SPS-ALPHA Mark-II concept proposes that the photovoltaic (PV) power generation system would consist of an extremely large number of mass-produced modular PV elements that would "self-assemble" into the SPS structure. David Criswell introduced a significant variation of the SPS concept called the Lunar Power System (LPS) system which proposed the in-situ use of lunar materials for the construction of the SPS elements. The GE \oplus -LPS is a SBSP concept that incorporates both technological approaches with a possible lunar tourist destination. The elements of the GE \oplus -LPS would be constructed primarily from lunar resources using a lunar based automatized manufacturing process connected to a mass driver system for transport into a lunar orbit. Earth-Moon L1 would be an appropriate assembly point. The toroidal design allows for the addition of a habitat and control center that would use water and lunarcrete for radiation shielding. The GE \oplus -LPS incorporates an ion electric propulsion system to enable artificial gravity for crew and guests as well as to provide maneuverability and attitude control. As the lunar manufacturing operations could be scaled to any dimension, SPSs assembled in lunar orbit could provide much needed clean solar energy for terrestrial purposes. The GE \oplus -LPS has two practical objectives: 1. it is an optimized technical approach to economically realizing SBSP as a means to address the energy dilemma and climate emergency issues on Earth, and, 2. it provides an inspiring and purposeful facility for developing humanity's lunar aspirations.

A short bio

Arthur R. Woods is a Swiss independent researcher and astronautical artist with two art projects successfully flown on the Russian Mir space station: the Cosmic Dancer sculpture in 1993 and Ars Ad Astra: The First Art Exhibition in Earth Orbit in 1995 during the EuroMir95 mission. His work has been exhibited in a number of international space and art exhibitions, most recently (2019) in 'Fly me to the Moon. The Moon Landing: 50 Years On' at the Kunsthaus Zürich. He has co-managed several studies for the European Space Agency. He is a member of the International Academy of Astronautics and co-chair of the Moon Village Association's Cultural Considerations Working Group.